DOCUMENT RESUME

ED 410 937 IR 018 499

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TITLE	MIS On-Line.
PUB DATE	1997-00-00
NOTE	9p.; In: Association of Small Computer Users in Education (ASCUE) Summer Conference Proceedings (30th, North Myrtle Beach, SC, June 7-12, 1997); see IR 018 473.
PUB TYPE	Reports - Descriptive (141) -- Speeches/Meeting Papers (150)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	Change; *College Curriculum; *Computer Assisted Instruction; Computer Mediated Communication; Educational Technology; Higher Education; Instructional Innovation; *Introductory Courses; *Learner Controlled Instruction; *Management Information Systems; Nontraditional Education; Program Development; Student Attitudes; Teacher Attitudes
IDENTIFIERS	*Northwest Missouri State University

ABSTRACT

This paper describes the resources, processes and outcomes involved in the development of an introductory Management Information Systems (MIS) course designed to utilize as many of the technologies as possible to redefine the teaching/learning paradigm. The MIS-Online project at Northwest Missouri State University encompasses the available campus technology, access to the World Wide Web via Netscape, and local VAX services providing e-mail, and personal accounts; the textbook chosen also provides a CD containing the complete text plus a summary version with additional items such as video and audio supplements and quizzes and practice exercises. Students receive information and some class instruction via e-mail and are required to communciate with the instructor via e-mail. They are also required to use the MIS Web site which is laid out similar to the book. The remainder of the paper discusses the project development, maintenance, student acceptance of learner-controlled instruction; changes in the notion of traditional learning; costs; benefits; and outcomes and lessons learned. (AEF)

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MIS On-Line

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Introduction

The concepts generally taught in an introductory Management Information Systems course include technologies like the World Wide Web, operating systems, and other business related software. This course was designed to utilize as many of these technologies as possible to redefine the teaching/learning paradigm. Using these technologies to produce the content and setting up the classroom environment requiring the use of them to retrieve and learn the concepts allows the student greater control and flexibility in their learning processes. The teacher's role becomes one of mentor, guide, or coach to help the student negotiate the learning process. Thus, in the MIS course, this methodology becomes both the means and the ends to the learning activity.

Development of this paradigm shift is a daunting task in a variety of ways. It requires the redefinition of roles for both students and faculty. A tremendous amount of time and resources to acquire, negotiate, develop, build and disseminate must be available. And most importantly, it requires a team to produce and define the process and outcomes. This paper describes those resources, processes and outcomes in an attempt to share what we have learned with others who may wish to embark on a similar journey.

Rethinking the paradigm

Redefining the role of the faculty member from "sage on the stage" to "guide on the side" requires both the faculty member and the student to reassess their roles and responsibilities in unfamiliar terms. The locus of power which has been held by the faculty member is often hard to give up for both groups. There is a position of esteem and an expectation of decision making that has a long established hierarchical tradition. To move the student into the game as a learning team member with the faculty as mentor or coach requires new commitments and understanding of expectations from each. Some students view this shift as the faculty member "abdicating" their assigned role. Some faculty refuse to give up that position of power for the one of facilitator. This experience has shown this to be true and a difficult obstacle to effectively handle.

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For the undergraduate student whose concerns are more closely geared to personal needs and professional goals—graduating and getting a job—they do not often take kindly to such a diverse "opportunity" for learning how to learn differently. They have become accustomed to the traditional model which often requires little more of them than listening and regurgitation. It is a simple, efficient method for handling large numbers of students. The student can usually be as visible or invisible in this type of environment as they choose depending upon their level of desire and interest. The new paradigm does not allow them this type of anonymity. Instead, it requires attention to both the process of learning and the content to be digested. The student must glean information, assess its value, organize its content, and relate it to other media. Trying to accomplish this in one semester in one class when the rest of the world operates in the traditional mode has proven to be quite challenging to most undergraduate students. A significant amount of time was required to gain acceptance and build confidence. Much discussion about process and less discussion on content became the norm during the class time.

This model for implementing the paradigm shift requires significant levels of technology and access. The Northwest campus is fortunate to have had since 1987 several microcomputer labs, computers in each residence hall room and faculty office, and several classrooms equipped with multimedia teacher stations and computer ports for desktops or laptops. Students are exposed to computing technology from their first appearance on campus and are expected to become computer literate quickly. However, it was discovered through this research process that exposure and literacy clearly do not imply proficiency or competency. Part of this is due to the fact that the technology changes so rapidly. Most of the students who learned well as in-coming freshman found that by the time they took MIS their skills were no longer current. For example, when the students in the junior/senior level MIS course took computer literacy they were using Windows 3.1 and there was no access or real knowledge about the Web. Much time had to be devoted to updating their skills and building current computing proficiency.

Technology and Interactive Content

The MIS-Online project encompasses the available campus technology including microcomputers with Windows 95 and Office 95, access to the World Wide Web via Netscape, and local VAX services providing e-mail, and personal accounts. The textbook chosen also provides a CD containing the complete text plus a summary version with additional items such as videos and audio supplements as well as quizzes and interactive practice exercises. Students can check out the CD from the instructor. Many students have their own computers and there are several labs on campus with CD-ROM capability. Audio and video output is usually not allowed in computer labs without headphones.

Students receive information and some class instruction via e-mail and are required to communicate with the instructor via E-mail. Northwest has an extensive local area network with terminals in every dorm room and dial-up connections. In addition, students are required to utilize the local Windows95 network using Network Neighborhood. Various class materials are posted to the server by the instructor. The client/server network makes these resources accessible anywhere on campus. Off-campus students have access to these resources if they have appropriate modem and software capabilities on their home computers.

Finally, students are required to utilize the MIS web site that has been developed by the project team. An attempt has been made to make the web site one of the focal points of information gathering for the class. The web site is laid out similar to the book, with chapters as the major sections. Each chapter selection of the web site has the following choices:

Objectives - Students can read what is expected of them for each chapter.
Notes - Students can access chapter outlines.
Slideshow - Students can view Powerpoint presentations from prior classes.
Those deemed to be most effective by the instructor are placed on the web site.
Internet Connection - Students can link to the Prentice Hall site for additional supplementary information and online cases.
Articles - Students can access relevant Wall Street Journal articles
FAQ - Students can view some of the most frequently asked questions and their corresponding answers.
Quiz - Students can take a 10 question self-check using a Java applet.
Hotlinks - Students can access sites that are relevant to the chapter.

In addition, students can access the syllabus for any section, report guidelines, files they need for lab exercises, and other related content. A weekly banner message is posted to the home page of the web site. This message usually refers to upcoming tests and projects.

The web site is hosted on the Northwest server which uses a VAX VMS operating system. Given the relative obscurity of navigating in this system, several Windows applications have been developed in Java to automate the tasks of updating the web site. This facilitates the maintenance and information modification.

Development

The project began during the 1995-96 academic year when the project team consisting of the faculty member, graduate student, and undergraduate student began studying on-line delivery of courses. Two sites were found to have advanced use of on-line courses. The team visited the University of Illinois Champaign-Urbana where the physics department had utilized an on-line method of administering tests and disseminating class information. Using a UNIX-based system, they had developed a comprehensive web site for the entry-level physics class of approximately 1500 students.

In January of 1996, the team visited the West Point Military Academy in West Point, New York. At the academy, the Computer Science department had developed a comprehensive web site, the model of which was being used campus wide. Students could access class information, view past projects, and take tests on-line. This model was selected as their technology was similar to Northwest's and curriculum would be easier to convert using this model.

During the summer of 1996, development began on the MIS Web site. Using various HTML editors and graphics programs available on the Internet, the first five chapters were developed. In addition, since an on-line quizzing system was to be included a study of Java-related information available at the time was begun.

During the fall of 1996, web site development expanded rapidly. The project team grew to seven with undergraduate students providing assistance ranging from editing and proofreading to coding and implementation. All 19 chapters were completed with the addition of FAQs, Wall Street Journal articles, Powerpoint slideshows, and a prototype quiz. A password protection was added to the site, due to the use of proprietary materials located therein.

During Spring 1997, a complete overhaul of the site was done, making it more user friendly. Several Java-based applications were added to automate some of the web site updating tasks. The instructor no longer had to navigate through the VMS system, he/she only had to use a very simple, familiar Windows interface. The use of a quiz system for a portion of the class is being developed.

Maintenance

The team has found maintenance of the web site, and of the MIS on-line curriculum in general, to be very time consuming. The instructor oversees development of on-line curriculum, a graduate student handles administrative and coordination duties and assists with development of on-line curriculum, and four undergraduate students continually work on development and updating of the web site, audio/video materials, the quizzing system, and Wall Street Journal articles and hot links. The team also encountered the typical problems of a complex project: communication among team members was limited, and a lack of documentation was prevalent.

During the current semester, the project team works an average of 70 hours per week. The project team has increased its productivity dramatically through a better system of communication and documentation. Another Undergraduate student joined the team for 10 hours a week to do any coding tasks that were needed. This allowed other members to focus on strategic development of the system. In addition, documentation procedures were outlined, which greatly enhanced the project's comprehensiveness.

Overall, the needs of the project have dictated the massive amount of time for maintenance. The team has found it is essential that enough people with varied talents put a consistent amount of time into the project. Otherwise, the project remains stagnant and technology passes it up.

Learning

Even for those few students who are familiar with the subject of Management Information Systems, learning to learn in a totally new classroom environment has been found to be rather daunting for most students. Generally, students are comfortable with the lecture-text-test format of a university course. It may or may not be the best way in which they learn, but it is the traditional classroom format and most students have managed to make that system work for them. Trying to change those deeply ingrained behaviors does not happen quickly or painlessly for either the student or the faculty member.

More time than was initially anticipated was needed to reduce the earlier learned behavior and create an acceptance of the new methods. Much more resistance was encountered and much less excitement was generated as students perceived these new methods to be multiplying their work loads rather than giving them control over the learning process. Class time had to be spent in talking

about learning styles, presenting the components available, and showing their interrelationships. Students perceived that this class would be "hard" because they were moved into a learning environment unlike any other in their past or present college experience.

Accepting the fact that they had more control meant accepting a broader responsibility for their own learning and blasted the old paradigm—you teach, I learn. The new paradigm—you show me, I select, evaluate, and control my learning process is a scary scene for most young college students. They have trusted the "sage" to give a limited amount of information and gear them to precision learning.

Unfreezing

So how do we as educators facilitate the simultaneous learning of subject while re-learning the process? By offering the student a share in both the material and the manner in which it is presented. Even for the media enthusiast, this means study habits must be re-evaluated and re-learned in order to master the new technology in the classroom. What is important? What comes first? How do I learn the media and the subject all at the same time? How will I be graded/evaluated? These are questions that students ask, and questions they must have answered before they can adapt their own process of learning to suit the situation. This implies, of course, that there is a willingness to relearn these "comfortable" behaviors.

In an on-line course, the same material, the core of the subject, is presented in many different forms. For the student, especially at first, it all looks different. "Overwhelmed" is a word frequently heard in the first weeks of class. Therefore, an important first step is the introduction of the different elements as just that, different elements of the same course; similar or related material presented in multiple formats. A student learns to view multi-media as welcome alternatives, not additional requirements. This requires an un-freezing of the traditional definition of learning. Yes, a text is required. So is attendance in class, e-mail, use of the course Web site, Power Point, audio, video, and taking notes. But these are all inter-related through subject matter presented in different formats, not a collection of formats presenting unrelated material. The question now facing the student is not what to study, but where to begin, and where to concentrate.

Refreezing

Perhaps the easiest way to make this new environment work for the class is to let each student make the crucial decision of how to approach the course material by individually working through the formats in which a module is presented. At first, the sheer volume of the media can indeed appear overwhelming, but soon one distinguishes the similarity among the concepts presented in class, in the text, and on the Web site. Terms used in discussion and concepts outlined in class are also reviewed via audio, CD-ROM, multi-media activities, and applied to real life situations in video clips. Recent news items as well as hot-links to sites which put into practice the concepts discussed in the module serve to bring the subject matter to life. The student is thus faced with the easier-to-digest job of ranking these different applications in order of personal preference.

A student who does not learn easily from reading a textbook has alternatives, reinforcements and interpretations of the subject matter through a variety of options. For those who do not take notes

well in class. Power Point lecture outlines can be a excellent source for review, and downloading the text onto disk prior to class provides an easy outline which utilizes the personal computer in the classroom. If time permits, students should be encouraged to participate in an evaluation of learning styles. These tests are generally based on the Felder five-dimension model of learning and are available through many testing sources.

Costs

With such a unique course providing so many benefits to the learning process, why aren't these sections overflowing with prospective students? Because there is a direct relationship between the cost to the student and the benefit thereof. Cost here refers not only to the financial aspect but also to a serious time commitment. It is of immense benefit to the student to have a computer at home with Internet access so the Web site is available whenever needed. This implies that a relatively fast modem be used to minimize downtime in connecting to sites and downloading information. High speed, high density formatted disks are a necessity, and CD-ROM access highly desirable. Of course, a good quality sound card and high resolution monitor only add to the sensory stimulation of the presentation, which aids in long-term memory storage.

But the highest cost of the course is less readily measurable, that of time. In order to sort through all the available information, prepare for class discussion and note-taking adequately and utilize the on-line quizzes, one must prepare ahead, and then review. This all takes time, and not every student is dedicated enough to their own education to put that kind of time into the learning process. Some would even feel they made the wrong choice by not taking a more comfortable class which uses the traditional methods—their opportunity cost appears quite high.

Benefits

And what happens to student motivation on those days when the web is down, modem lines are jammed, and yes, the computer ate my disk with all my notes on it. In a way, this is preparation for the business world. In real life, the hard drive crashes, e-mail can't be accessed, and carefully prepared presentations are not compatible with conference room equipment. It is better to have experienced all this in the relatively safe classroom environment, where group discussions can solve at least some of the problems. The costs of invested time, both from the aspect of student preparation and on-the-spot problem-solving due to non-functioning technology translate into long term benefits. A student who has used a variety of technology in the class, from note-taking onto a disk to designing a web page, is truly prepared for technology in the business world. Thus an important part of student learning becomes utilization of the classroom technology on a personal level.

Many electronic courses today assume students are adept enough in computer technology to make it a part of their daily classroom habits. Our work with students enrolled in the MIS On-line course has proven otherwise. Although all students enrolled in the University must take a basic "Using Computers" class, and all residence hall rooms are outfitted with computers, not everyone proves able (or, perhaps willing) to immediately utilize what they have learned. The first class invariably becomes a lesson not in MIS, but in computer skills, turning the machine on and off, setting up screens for multi-tasking, sizing a note-pad for on-screen use. The lost time is made up

later in the term when students are able to move at their own pace.

We begin with an introduction to the equipment and software. While everyone may be familiar with the basic computer, they all seem to have the "on" switch in a different place and a quick walk-through eases student tension. A few experienced assistants circulating through the classroom is important at this stage of the process as students try to become comfortable with computer use. In the second class meeting, we do not assume that anything the students accomplished in the previous meeting has become an acquired skill. The class walks through the steps for setting up the screens and opening programs. We expected fewer problems than we actually had—there was much more learning and relearning as well as troubleshooting. Disks were not formatted, the mouse jerked, files "disappeared", things we never thought possible and for which there was no real explanation happened. Each error became a lesson in classroom computing and an opportunity to teach. Errors can be shared in a positive manner as a learning "experience" and students will begin to understand they are thinking about their learning PROCESS and well as the content. They also build confidence in their competence when they can tell someone else what they found out—even though it may have been only a few minutes earlier!

We also make a point of showing the class how those fancy slides projected in class can be converted to a learning tool, a permanent outline of the lesson. In the time it takes to demonstrate re-sizing the text and adding personal notes to the file, students begin transferring old pen-and-pencil skills to the new media. The first time the class explores the Internet usually turns quickly into a "fun" time as students find interesting sites and what they call "cool stuff out there." They are then shown how to view, bookmark, and download information to a floppy disk. They also see that the tool they are using is what people all over the world are also using and their home university is just as strong a presence in this electronic world as any other place or entity.

Student work becomes part of the legacy system of the course. Later in the semester they are given projects to develop in multi-media which relate to the weaknesses of the course content or delivery. The best work is included in the web site for future classes. A sense of ownership over the course material goes a long way toward removing the technological timidity of some students. The chance to leave their name and something behind to improve the quality of what is learned keeps interest active in both the subject and review of previous items. They also relook at the quality of the content and critically analyze both it and the processes in order to select and justify an appropriate topic.

Outcomes and Lessons Learned

Some of the most important lessons realized through this development process were the importance of the team approach and the need for clear and complete documentation of all system components. Each team member contributed specialized knowledge and accepted specific responsibility for tasks such as site development, evaluation of course materials, assisting in class learning, assessing understanding, writing software, contacting publishers, designing layouts and many more.

Confusion became evident as the project became more complex and more components were in place. Inconsistencies were found as updates were made and one team member assumed primary

responsibility for re-establishing continuity and consistency throughout the web site. The master documentation notebook became the mainstay of the communication interaction of team members and progress tracking. Weekly staff meetings with agendas and minutes helped tremendously to guide the later development at the more complex stages.

We have learned not to expect everyone to take to multi-media learning like a duck to water. Just as there are students who do not learn easily from a lecture-and-text format, there will be those who do not adapt well to technology. If we measure success not by what the class is currently doing, but by how far they progress toward acceptance and use of an alternative learning environment in the span of the term, we hope we have an accurate measure of achievement. Removing computer fears and phobias and replacing them with knowledgeable technology users who view the tool as a vehicle rather than an end will hopefully translate into an attitude of quality lifelong learning.

Society is fast moving away from paper and pen and into computerized record-keeping of all sorts. Already more material is available to the student via computer than is readily accessible in the printed word, and the technological field is still growing. When a college course is introduced in which the traditional boundaries of lecture notes, textbook readings, and written tests are removed and material appears in very new and different forms, it is truly imitating today's business world. The student who masters this new process of learning will not only do well in class, but will be best prepared for the business environment of the future.

Notes

"Hitting the Books at a Virtual Campus," Business Week, 11 November 1996, 10.

See MIS Course Site, <www.nwmissouri.edu/~0500460>

Dr. Sylvia Charp, "Multiple Media for he Classroom & Media Center," T.H.E. Journal, February, 1997, 6.

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Barry Richmond, "Simulating the Business Experience," in Teaching Materials, Harvard Business School Publishing, Fall 1996. 3. Business simulations are a core feature of the MBA curricula.

"Teaching the 'Net without a Net: Custom Simulations Boost Freshmen's PC Skills," T.H.E. Journal February 1997, Vol. 24, no. 7, p 87-91. Note the assumption made regarding student computer knowledge.

New Zealand Education study completed by Learning Enhancement Associates (NZ) Ltd. <http://www.lea.co.nz/whoisl~1/leainfo.htm>